SPACE-RAY®
INFRARED GAS HEATERS

SUBMITTAL DATA

INFRARED RADIANT HEATER

☐ DK SERIES CERAMIC HEATERS

☐ NATURAL GAS
(CHECK ONE)
☐ PROPANE GAS

PROJECT:	DATE:
ADDRESS:	
ARCHITECT/ENGINEER:	
ADDRESS:	
CONTRACTOR:	
ADDRESS:	
SUBMITTED BY:	

EQUIPMENT USED:

ACCESSORIES:

☐ Chain Mounting Kit:	☐ Gas Shut-Off Valve:
☐ Thermostat:	☐ Reverb Screen:
☐ Gas Pressure Regulator:	☐ Other:
☐ Parabolic Extension:	☐ Other:

1) GENERAL INFORMATION

This heater complies with ANSI Z83.19 (current Standard) and CSA 2-35.

This heater is a self-contained infrared radiant ceramic heater for use in locations where flammable gases or vapors are not generally present (as defined by OSHA acceptable limits) and is intended for the heating of nonresidential spaces.

INSTALLATION REQUIREMENTS

Installation of this heater must be in accordance with all applicable codes shown in the instructions and/or the local codes and authorities having jurisdiction. In Canada, the installation must conform to current CAN/CGA-B149.1/2 Installation Code in the absence of local codes. Heaters shall be installed by a licensed contractor or licensed installer. Clearances to combustibles as outlined in this manual should always be observed. In areas used for storage of combustible materials where they may be stacked below the heater, NFPA54 requires that the installer must post signs that will "specify the maximum permissible stacking height to maintain the required clearances from the heater to combustibles."

Every heater shall be located with respect to building construction and other equipment so as to permit access to the heater. Each installer shall use quality installation practices when locating the heater and must give consideration to clearances to combustible materials, vehicles parked below, lights, overhead doors, storage areas with stacked materials, sprinkler heads, gas and electrical lines, and any other possible obstructions or hazards. Consideration also must be given to service accessibility.

The heater, when installed in aircraft hangars and public garages, must be installed in accordance with ANSI/NFPA 409-latest edition (Standard for Aircraft Hangars), ANSI/NFPA 88a-latest edition (Standard for Parking Structures), and ANSI/NFPA 88b-latest edition (Standard for Repair Garages) with the following clearances:

a. At least 10 feet above the upper surfaces of wings or engine enclosures of the highest aircraft that may be housed in the hangar and at least 8 feet above the floor in shops, offices, and other sections of hangars communicating with aircraft storage or service areas.
b. At least 8 feet above the floor in public garages. ▲WARNING: Minimum clearances marked on the heater must be maintained from vehicles parked below the heater.

(FOR CANADA ONLY)

a. Installation of this appliance is to be in accordance with the latest edition of CAN 1-B149.1llation Code for Natural Gas Burning Appliances and Equipment), and/or CAN B149.2 (Installation Code for Propane Gas Burning Appliances and Equipment).
b. For installation in public garages or aircraft hangars, the minimum clearances from the bottom of the heater to the upper surface of the highest aircraft or vehicle shall be 50 percent greater than the certified minimum clearance, but the clearance shall not be less than 8 feet.

Although these heaters may be used in many applications other than space heating (e.g., process heating), Gas-Fired Products, Inc. will not recognize the warranty for any use other than space heating.

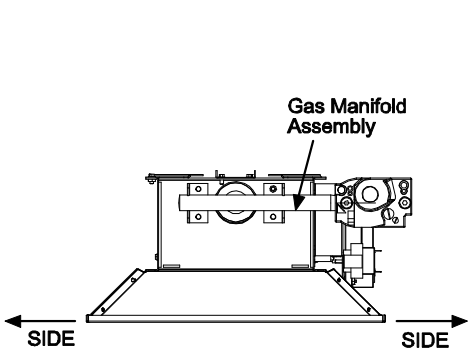
This heater is for Indoor Installation only and can be used in unvented mode. The term Unvented actually means Indirect Vented. While the products of combustion are expelled into the building, national codes require ventilation in the building to dilute these products of combustion. This ventilation may be provided by gravity or mechanical means.

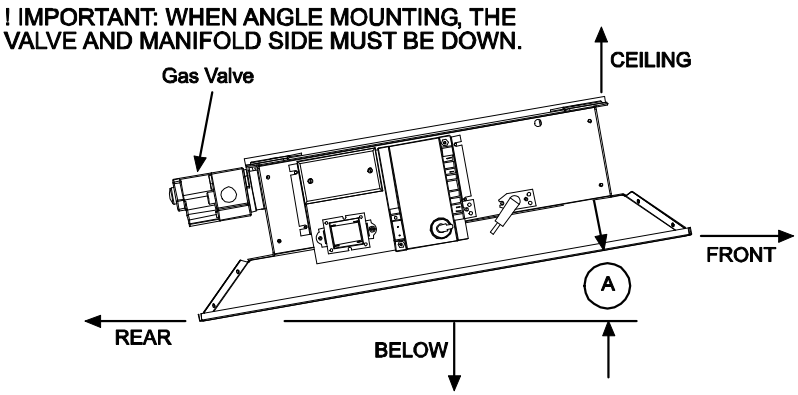
This heater is not an explosion proof heater. Where the possibility of exposure to volatile and low flash point materials exists, it could result in property damage or death. This heater must not be installed in a spray booth where the heater can operate during the spraying process. Consult your local fire marshal or insurance company.

▲WARNING: Certain materials or objects, when stored under the heater, will be subjected to radiant heat and could be seriously damaged. Observe the Minimum Clearances to Combustibles listed in the manual and on the heater at all times.

2) MINIMUM CLEARANCES TO COMBUSTIBLES

Minimum clearances shall be measured from the outer surfaces as shown below:





MINIMUM CLEARANCES TO COMBUSTIBLES										
	Mounted Horizontally				Mounted at 35° Angle					
			BELOW		BELOW		FRONT			
MODEL	SIDES	CEILING	w/Standard Reflector	w/Reflector Extension	w/Standard Reflector	w/Reflector Extension	w/Standard Reflector	w/Reflector Extension	REAR	Angle Mounting (degree)
DK30 DK35 DK33 DK40	30"	36"	72"	100"	72"	100"	36"	50"	30"	0° min 35° max
DK60 DK70 DK66 DK80	48"	48"	98"	137"	98"	137"	48"	68"	36"	0° min 35° max
DK100 DK120	48"	64"	128"	180"	128"	180"	60"	84"	48"	0° min 35° max
DK132 DK160 DK140	60"	64"	136"	190"	136"	190"	64"	90"	48"	10° min 35° max

NOTE: The clearances specified above must be maintained to combustibles and other materials that may be damaged by temperatures 90°F above ambient temperature. It is the installer's responsibility to ensure that building materials with a low heat tolerance which may degrade at lower temperatures are protected to prevent degradation. Clearances to combustibles are posted on the reflector near the control end of the heater. In locations used for storage of combustible materials where they may be stacked below the heater, NFPA 54 requires that the installer must post signs that will "specify the maximum permissible stacking height to maintain the required clearances from the heater to combustibles." Space-Ray recommends posting these signs adjacent to the heater thermostat or other suitable location that will provide enhanced visibility.

3) SPECIFICATIONS

MODEL NO.	BTU/HR INPUT	NUMBER OF BURNERS	ORIFICE SIZEΨ		SHIPPING WEIGHT	MINIMUM MOUNTING HEIGHT (feet)
			Natural Gas	*Propane Gas*		
DK30-N5B	33,000	1	3/32"	n/a	30 lbs.	11
DK35-N5B	35,000	1	#41	n/a	30 lbs.	12
DK40-N5B	40,000	1	#38	n/a	30 lbs.	12
DK60-N5B	65,000	2	3/32"	n/a	35 lbs.	13
DK70-N5B	70,000	2	#41	n/a	35 lbs.	13
DK80-N5B	80,000	2	#38	n/a	35 lbs.	14
DK100-N5B	100,000	3	#41	n/a	48 lbs.	15
DK120-N5B	120,000	3	#38	n/a	48 lbs.	16
DK140-N5B	140,000	4	#41	n/a	58 lbs.	17
DK160-N5B	160,000	4	#38	n/a	58 lbs.	18
DK33-L5B	33,000	1	n/a	#52	30 lbs.	11
DK66-L5B	66,000	2	n/a	#52	35 lbs.	13
DK100-L5B	99,000	3	n/a	#52	48 lbs.	15
DK132-L5B	132,000	4	n/a	#52	58 lbs.	17

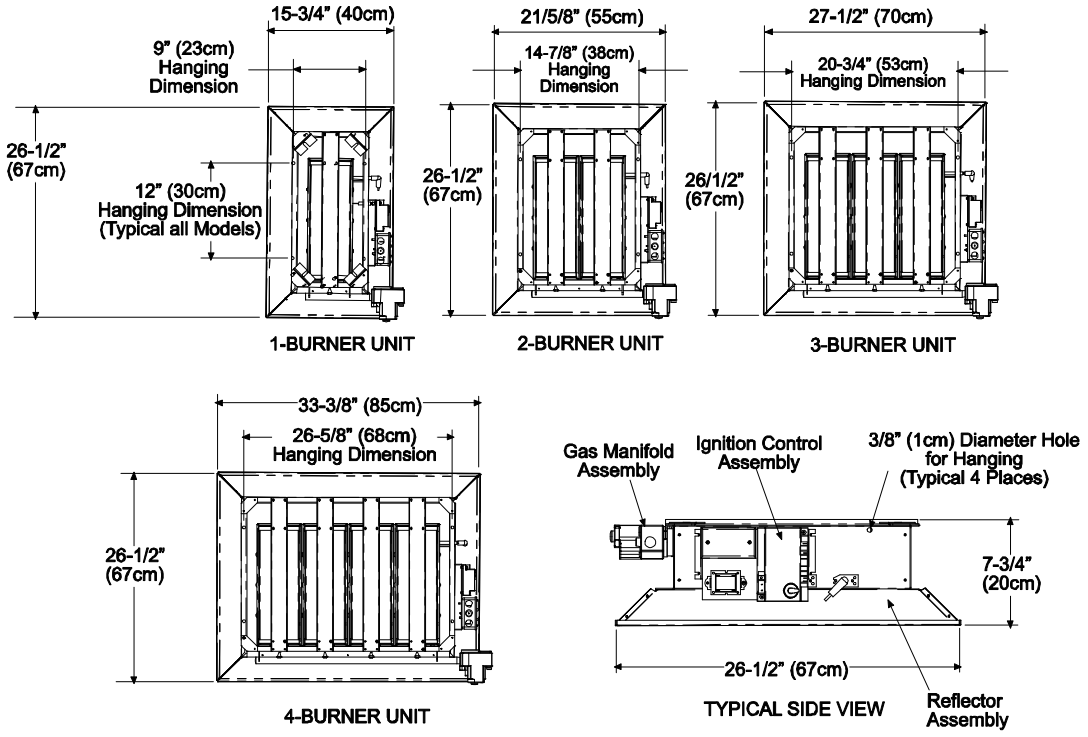
MODEL SUFFIX	
Gas Type:	Ignition System:
N = Natural L = Propane	5 = Direct Spark (115 Volt / 0.40 Amp / 60 Hz)

GAS-PIPE CONNECTION:
1/2" NPT (Female)

Ψ One Orifice Per Burner

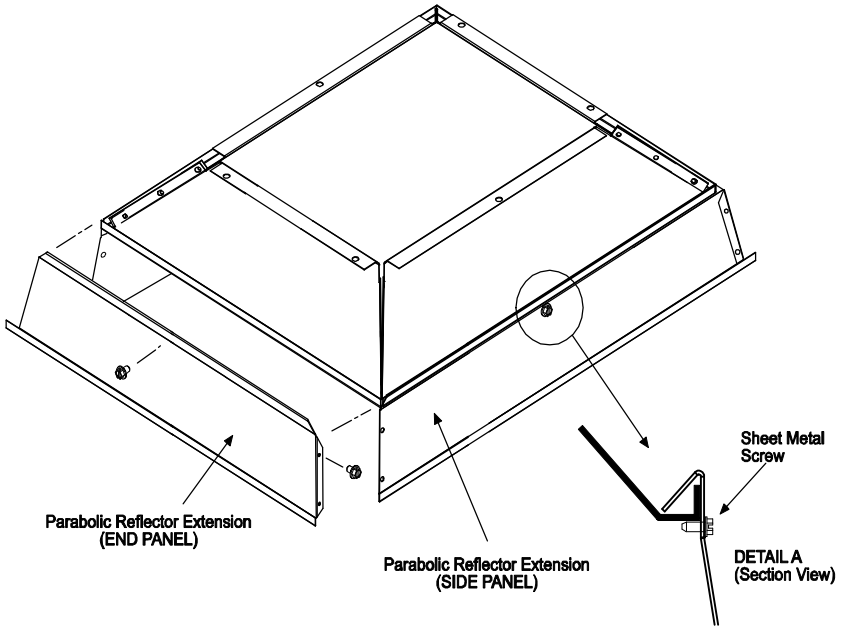
*MOUNT HEATERS AS HIGH AS POSSIBLE. Minimums are shown as a guideline for human comfort and uniform energy distribution for complete building heating applications. Consult your **Space-Ray** representative for the particulars of your installation requirements.

4) DIMENSIONS



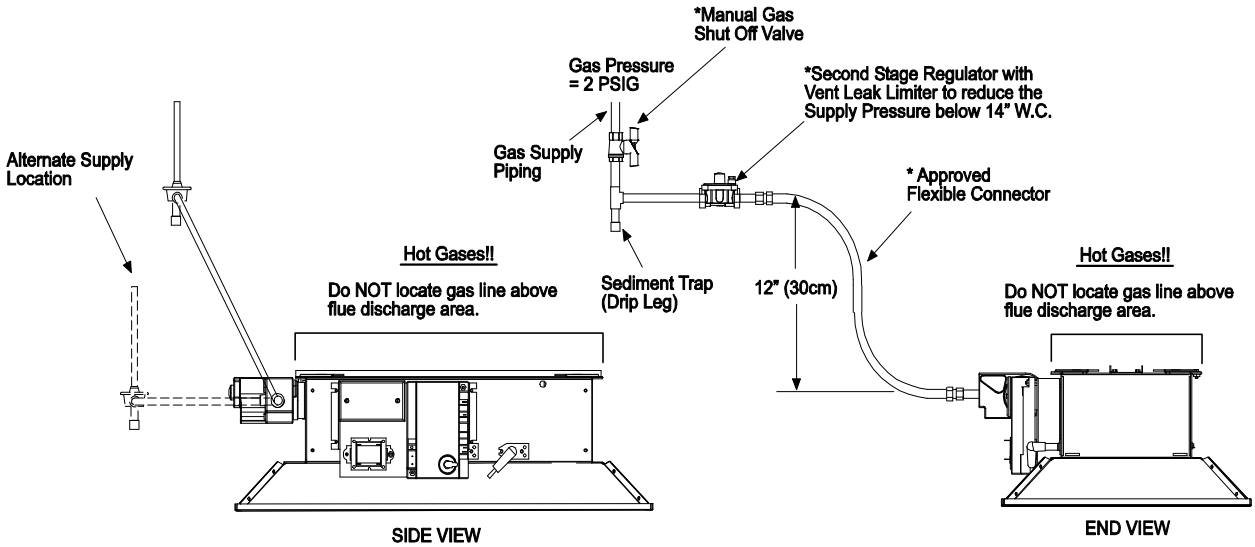
5) OPTIONAL PARABOLIC REFLECTOR EXTENSION ASSEMBLY

The heater is completely factory assembled and requires no field assembly. If the optional parabolic reflector extension is utilized, locate and identify the end panels and side panels as shown in the following diagram. Attach the side panels as shown. Attach the end panels so that the end flanges of the end panels overlap the side panels. Attach the side panels and end panels together with the screws provided in the kit. Attach the remaining screws as shown in Detail A. This is to ensure that the Parabolic Reflector Extension is securely attached to the reflector. The clearances to combustibles (shown on the clearance label that is secured to the reflector on the control end of the heater and in Section 4 of these instructions) must be closely observed.


Sheet Metal Screw
Parabolic Reflector Extension (END PANEL)
Parabolic Reflector Extension (SIDE PANEL)
DETAIL A (Section View)

6) GAS CONNECTION

If the maximum supply pressure is less than ½ psig, a second stage regulator is not required.


*Manual Gas Shut Off Valve
Gas Pressure = 2 PSIG
*Second Stage Regulator with Vent Leak Limiter to reduce the Supply Pressure below 14" W.C.
Alternate Supply Location
Gas Supply Piping
* Approved Flexible Connector
Hot Gases!!
Do NOT locate gas line above flue discharge area.
Sediment Trap (Drip Leg)
12" (30cm)
Hot Gases!!
Do NOT locate gas line above flue discharge area.
SIDE VIEW
END VIEW

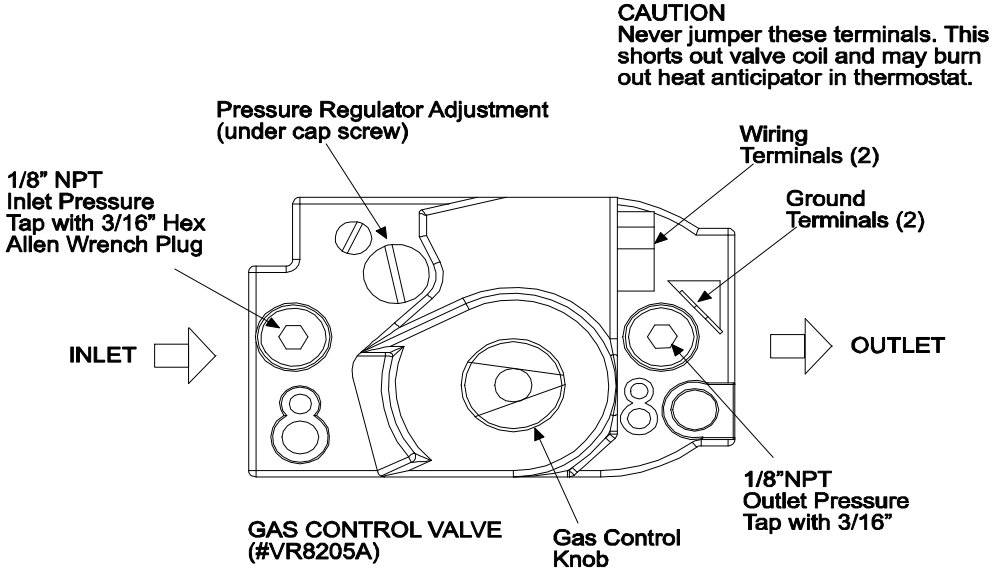
* Available as Accessories

TYPICAL GAS CONNECTIONS

7) GAS PRESSURE TABLE

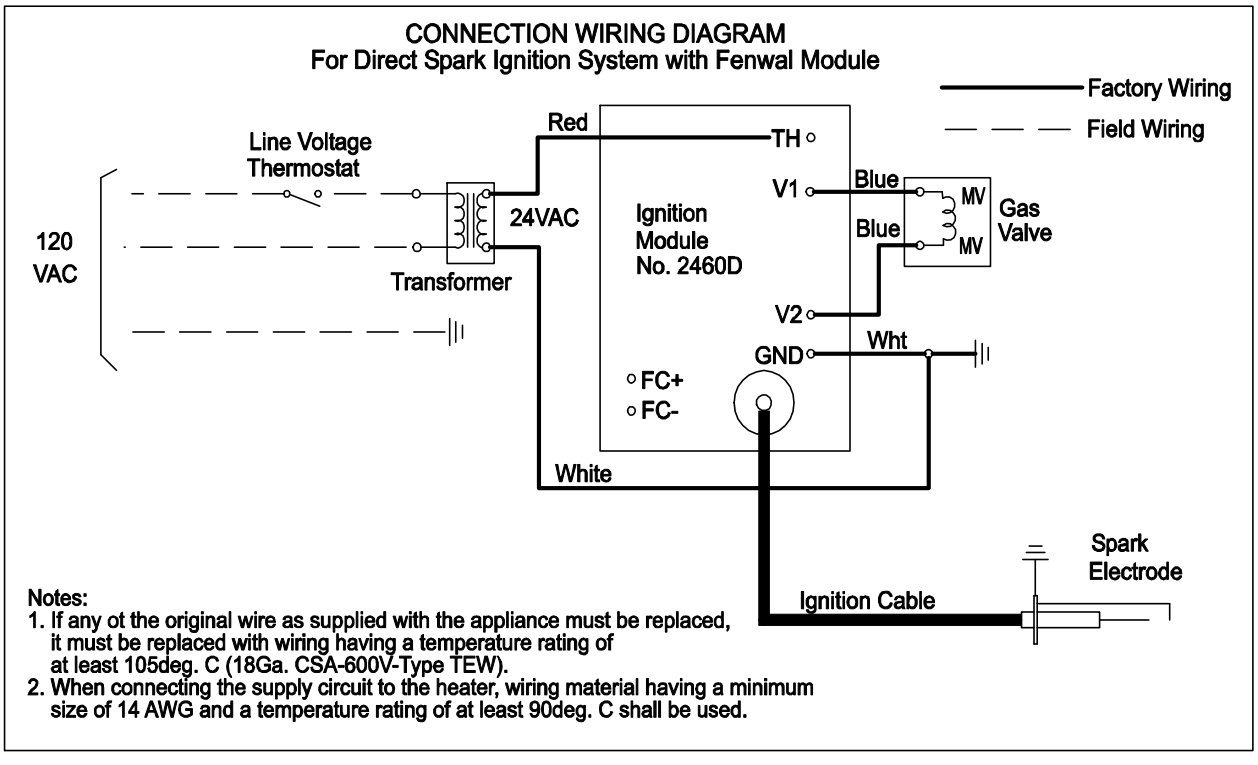
GAS PRESSURE TABLE				
HEATER MODEL	GAS TYPE	MANIFOLD PRESSURE	SUPPLY PRESSURE ☐*Minimum*	SUPPLY PRESSURE *Maximum*
DK (30, 35, 40, 60, 70, 80, 100 120, 140 & 160)	Natural	6" W.C.	7" W.C.	14" W.C.
DK (33, 66, 100 & 132)	Propane	10" W.C.	11" W.C.	14" W.C.

☐ Minimum permissible gas supply pressure for purpose of input adjustment.


CAUTION
Never jumper these terminals. This shorts out valve coil and may burn out heat anticipator in thermostat.
Pressure Regulator Adjustment (under cap screw)
Wiring Terminals (2)
1/8" NPT Inlet Pressure Tap with 3/16" Hex Allen Wrench Plug
Ground Terminals (2)
INLET
OUTLET
1/8"NPT Outlet Pressure Tap with 3/16"
GAS CONTROL VALVE (#VR8205A)
Gas Control Knob

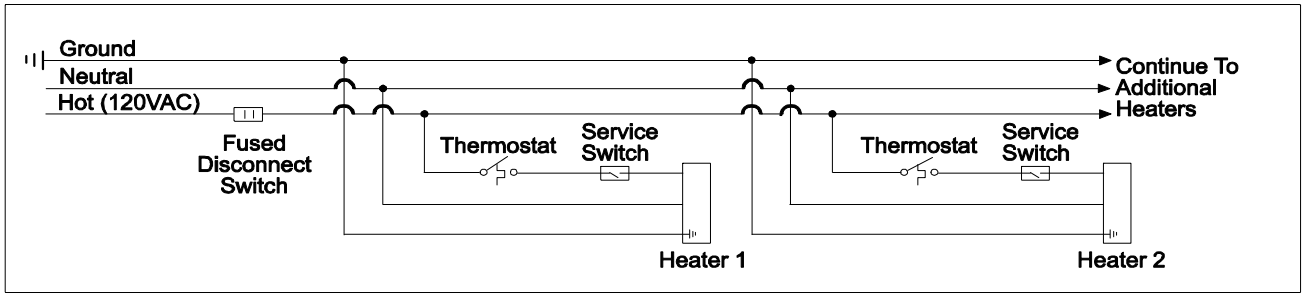
8) ELECTRICAL CONNECTIONS

TYPICAL HEATER WIRING DIAGRAM FOR DIRECT SPARK IGNITION SYSTEM

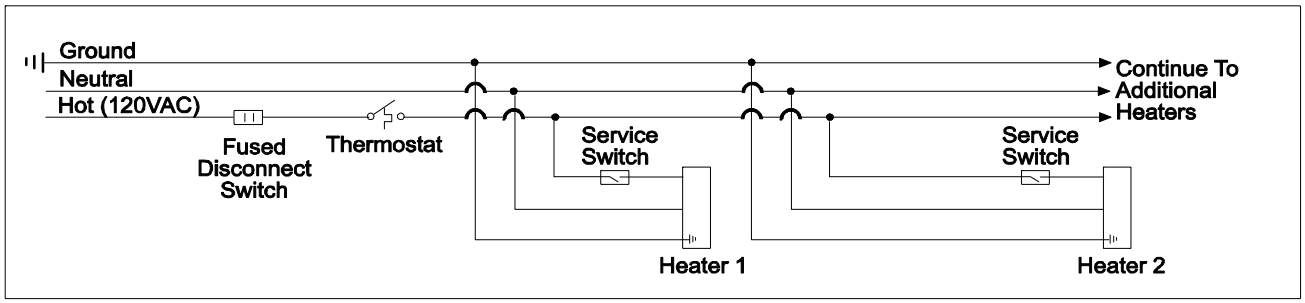


FIELD CONNECTION AND THERMOSTAT WIRING DIAGRAMS

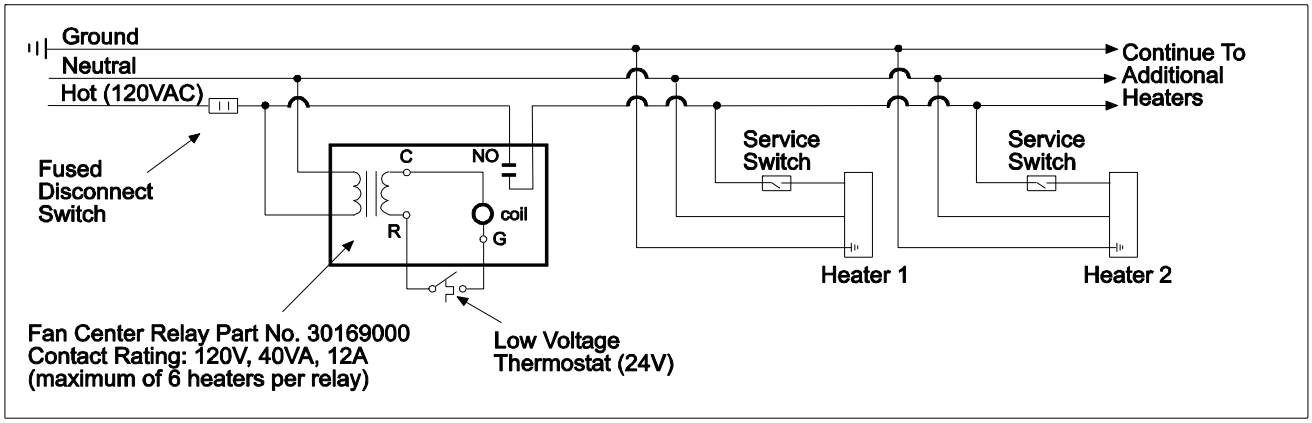
A. LINE VOLTAGE (120V) THERMOSTAT CONNECTIONS – SINGLE HEATER PER THERMOSTAT



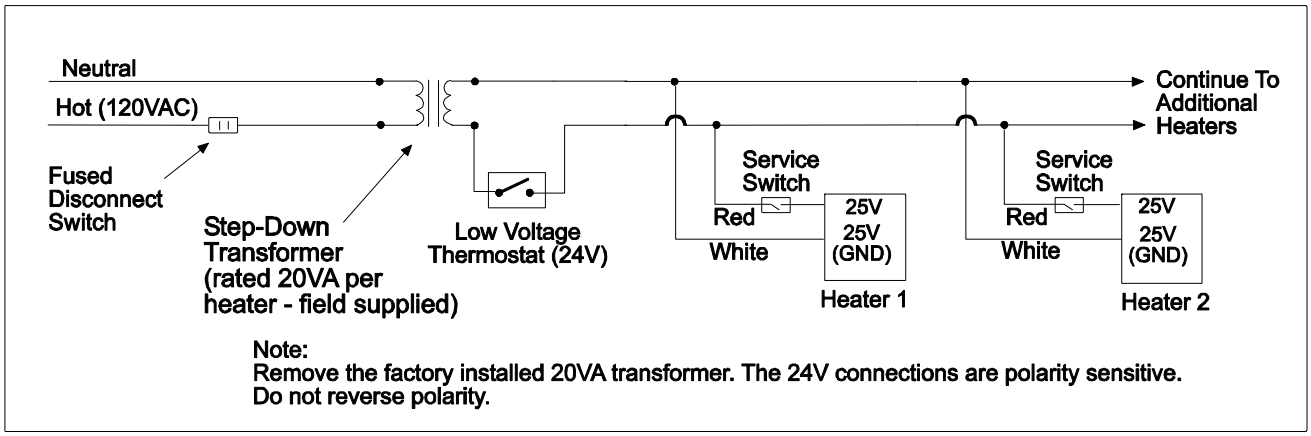
B. LINE VOLTAGE (120V) THERMOSTAT CONNECTIONS – MULTIPLE HEATERS PER THERMOSTAT



C. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS – MULTIPLE HEATERS PER THERMOSTAT – (POWER SUPPLIED FROM FAN CENTER RELAY)



D.LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS – MULTIPLE HEATERS PER THERMOSTAT – (POWER SUPPLIED FROM STEP-DOWN TRANSFORMER)



9) VENTILATION

Where unvented infrared heaters are used, natural or mechanical means shall be provided to supply and exhaust at least 4 cfm per 1000 Btu per hr input of installed heaters.

Exhaust openings for removing flue products shall be above the level of the heaters.

This heater requires ventilation in the building to dilute the products of combustion and provide fresh air for efficient combustion. Power ventilation is recommended and the minimum vent flow required is as follows:

DK30, DK33, DK35	140 cfm	DK100	400 cfm
DK40	160 cfm	DK120	480 cfm
DK60, DK66, DK70	280 cfm	DK132, DK140	560 cfm
DK80	320 cfm	DK160	640 cfm

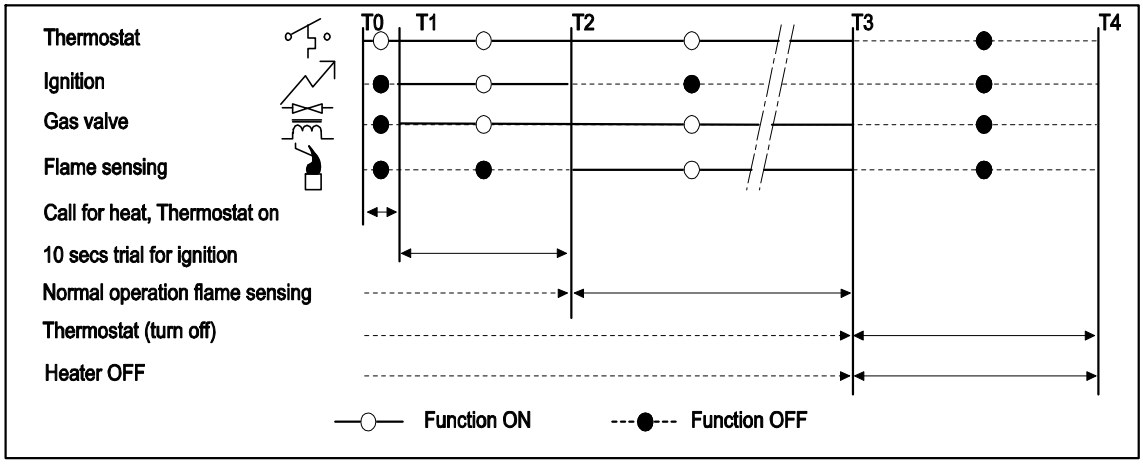
If gravity ventilation is used, the required square feet of inlet and outlet vent area (depending on height and temperature difference) is as follows:

DK30, DK33, DK35	0.49 s/f	DK100	1.48 s/f
DK40	0.57 s/f	DK120	1.72 s/f
DK60, DK66, DK70	0.98 s/f	DK132, DK140	1.97 s/f
DK80	0.98 s/f	DK160	2.30 s/f

The General Ventilation Rules outlined in ASHRAE GUIDE AND DATA BOOK should be observed when locating vents. Exhaust vents must be located at the highest point above and in the vicinity of the heaters and the inlet vents must be located below the level of the heaters. Local codes may require that mechanical exhaust systems be interlocked with the function simultaneously or allow control of exhausters to humidistat.

10) SEQUENCE OF OPERATION

The chart below shows the sequence of operation for the normal operating cycle of the heater when connected to a permanent 120V power supply and the heater is turned on and off by a remote 120V thermostat. (See Section 10)



If the flame is not sensed during sequence T2 then the burner will automatically begin re-ignition sequence T1. The ignition sequence will be repeated three times with a 15 second inter-purge. If the flame is not reestablished the heater will go to lockout.

11) LIMITED WARRANTY

LIMITED WARRANTY: Gas-Fired Products, Inc., the manufacturer, warrants to the original owner of any Space-Ray infrared gas heater that said heater will be free from defects in material or workmanship under normal use and service. The heater(s) shall be installed, used and maintained strictly in accordance with the manufacturer's instructions. The manufacturer's sole obligation under this warranty shall be limited to furnishing replacement parts, F.O.B. Charlotte, NC, for 12 months from the date of installation, or 18 months from the date of shipment by the manufacturer, whichever period shall expire first. Labor charges for removal of defective parts and the installation of the replacement parts are not included. This warranty applies only within the USA and Canada.

WARNING: Manufacturer's warranty shall not apply: (a) to damage to the heater when used in an atmosphere containing halogenated hydrocarbons or other corrosive chemicals. Some compounds in the air can be ingested into the equipment and can cause an accelerated rate of corrosion of some of the parts of the heating components. The use of such chemical compounds in or near the operating environment of the heater should be avoided where a longer heater life is desirable; (b) to any heater or components which have been repaired or replaced with other than factory parts, modified in any way, misused or damaged, or which have been used contrary to the manufacturer's written instructions. Replacement parts are available through Space-Ray representatives or their distributors.

LIMITATION OF WARRANTY: THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. WITHOUT LIMITING THE FOREGOING, THE MANUFACTURER EXPRESSLY EXCLUDES ANY AND ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND ANY IMPLIED WARRANTY OF MERCHANTABILITY FOR ITS PRODUCTS.

If any provision of this warranty is found to be void, unenforceable or unconscionable, then the same is hereby severed and the remainder of this warranty is hereby saved and shall remain in force.

EXCLUSIVE REMEDY: The sole and exclusive remedy under this warranty is the replacement of the defective parts or heaters as hereinabove specified. THE MANUFACTURER DOES HEREBY EXPRESSLY EXCLUDE ANY AND ALL LIABILITY FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES UNDER THIS OR ANY OTHER WARRANTY. Without intending to limit the aforesaid exclusion, THE MANUFACTURER DOES HEREBY EXCLUDE ANY LIABILITY UNDER THIS OR ANY OTHER WARRANTY FOR INJURIES AND COMMERCIAL LOSSES TO PROPERTY THAT RESULT FROM THE OPERATION, PROPER OR IMPROPER, OF ITS PRODUCTS.

ADDITIONAL WARRANTY ON HEAT EMITTING SURFACE AND BURNER: Manufacturer warrants to the original owner of any CSA design certified heater that, if installed, used and maintained strictly in accordance with the printed instructions received with the heater, the manufacturer will at any time during the below listed time periods, furnish at no cost to the original owner, replacement emitters or burners which have become inoperative by reason of any defect in our workmanship, materials or construction. The manufacturer's obligation under this warranty shall be limited to furnishing replacements under the following time periods from the date of installation:

	Emitter	Burner
DK Series:	5 Years	1 Year

The manufacturer will not be responsible for labor charges incurred for removal or installation of emitters. Any transportation charges involved in the return or repair are excluded.

ADDITIONAL TERMS: Manufacturer assumes no liability for delay in performing its obligations under the aforesaid warranty. Manufacturer assumes no liability for failure in performing its obligations thereunder if failure results directly or indirectly from any cause beyond its control, including but not limited to acts of God, acts of Government, floods, fires, shortages of materials, strikes and other labor difficulties or delays or failures of transportation facilities.

This is a Non-Residential product (excluding the CB Series which is certified for residential and non-residential use). Installation and service shall be by a Licensed Contractor and in accordance with National and Local Codes.

When presenting warranty claims, proof of date of purchase must be submitted.

No Representative is authorized to assume for the manufacturer any liability except as set forth above.

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